CLAIMS

What is claimed is:

1. A method of detection, comprising:

(a) receiving a signal representing a set of P symbols where P is a positive integer greater than 2;

(b) jointly estimating a subset of P_1 symbols of said set of P symbols where P_1 is a positive integer;

(c) after step (b), jointly estimating a subset of P_2 symbols of said set of P symbols where P_2 is a positive integer and wherein said subset of P_1 symbols and said subset of P_2 symbols are members of a partition of said set of P symbols and $P_1 + P_2$ is greater than 2.

2. The method of claim 1, wherein:

(a) $P_1 = P_2 = P/2$.

3. The method of claim 1, further comprising:

(a) after step (c) of claim 1, for each m in the set $\{3, \ldots, M\}$, jointly estimating a subset of P_m symbols of said set of P symbols where P_m is a positive integer and wherein said subset of P_m symbols is a member of a partition of said set of P symbols and $P_1 + P_2 + \ldots + P_M = P$ where M is a positive integer.

4. The method of claim 3, wherein:

(a) $P_1 = P_2 = \ldots = P_M = P/M$.

5. The method of claim 1, wherein:

(a) said jointly estimating of step (b) of claim 1 includes a decision using P_1-vector of soft estimates $\mathbf{F}_1\,\mathbf{r}$ where $\mathbf{r}$ is a Q-vector of said received signals of step (a) of claim 1 and $\mathbf{F}_1$ is a $P_1 \times Q$ matrix for zero-forcing estimation;

(b) said jointly estimating of step (c) of claim 1 includes a decision using P_2-vector of soft estimates $\mathbf{F}_2$ ($\mathbf{r} - \mathbf{G}_1 \mathbf{s}^{(1)}$) where $\mathbf{F}_2$ is a P_2 x Q matrix for zero-forcing estimation, $\mathbf{G}_1$ is a Q x P_1 matrix for zero-forcing feedback cancellation, and $\mathbf{s}^{(1)}$ is the P_1-vector estimation result of step (b) of claim 1.

6. The method of claim 1, wherein:

(a) said jointly estimating of step (b) of claim 1 includes a decision using P_1-vector of soft estimates $\mathbf{F}_1$ $\mathbf{r}$ where $\mathbf{r}$ is a Q-vector of said received signals of step (a) of claim 1 and $\mathbf{F}_1$ is a P_1 x Q matrix for minimum mean square error estimation

(b) said jointly estimating of step (c) of claim 1 includes a decision using P_2-vector of soft estimates $\mathbf{F}_2$ ($\mathbf{r} - \mathbf{G}_1 \mathbf{s}^{(1)}$) where $\mathbf{F}_2$ is a P_2 x Q matrix for minimum mean square error estimation, $\mathbf{G}_1$ is a Q x P_1 matrix for zero-forcing feedback cancellation, and $\mathbf{s}^{(1)}$ is the P_1-vector estimation result of step (b) of claim 1.

7. The method of claim 1, wherein:

(a) said jointly estimating of step (b) of claim 1 includes a decision using P_1-vector of soft estimates $\mathbf{F}_1$ $\mathbf{r}$ where $\mathbf{r}$ is a Q-vector of said received signals of step (a) of claim 1 and $\mathbf{F}_1$ is a P_1 x Q matrix for minimum mean square error estimation

(b) said jointly estimating of step (c) of claim 1 includes a decision using P_2-vector of soft estimates $\mathbf{F}_2$ ($\mathbf{r} - \mathbf{G}_1 \mathbf{s}^{(1)}$) where $\mathbf{F}_2$ is a P_2 x Q matrix for minimum mean square error estimation including feedback error compensation, $\mathbf{G}_1$ is a Q x P_1 matrix for zero-forcing feedback cancellation including feedback error compensation, and $\mathbf{s}^{(1)}$ is the P_1-vector estimation result of step (b) of claim 1.

8. The method of claim 1, wherein:

(a) said subset of P_1 symbols of step (b) of claim 1 is determined according to signal-to-interference-plus-noise ratios of said P symbols prior to a decision in said estimating.

9. The method of claim 1, wherein:

(a) said subset of P_1 symbols of step (b) of claim 1 is determined according to projected signal-to-interference-plus-noise ratios of said P symbols after a decision in said estimating.

10. The method of claim 1, wherein:

(a) said jointly estimating of step (b) of claim 1 includes a maximum likelihood decision; and

(b) said jointly estimating of step (c) of claim 1 includes a maximum likelihood decision.

11. The method of claim 1, wherein:

(a) said jointly estimating of step (b) of claim 1 includes a soft decision; and

(b) said jointly estimating of step (c) of claim 1 includes a soft decision.

12. The method of claim 1, further comprising:

(a) jointly re-estimating said subset of P_1 symbols using error compensation determined by said jointly estimating said subset of P_2 symbols of step (c) of claim 1.